REMARKS

Claims 1-29 were rejected prior to the Office Action. In the Office Action claims 1-29 were. In this response, claims 1, 18, and 24 is amended. Claims 1-29 are pending.

Claim Objections

The Office Action states:

Claim Rejections under 35 U.S.C. § 101

The Office Action states:

> 13. Claims 1-29 are rejected under 35 U.S.C. § 101 because the claims are directed to a judicial exception to 35 U.S.C. 101 i.e. natural phenomenon and are not directed to a practical application of such judicial exception because the claims do not require any physical transformation and the invention as claimed do not produce a useful, concrete, and tangible result.

Office Action, at 6.

Applicants disagree. Applicants do not seek to protect any abstract ideas, only certain implementations of methods for optimizing the number, placement, and size of fractures in a subterranean formation. The Office Action does not claim that such an optimization is not a useful result. Rather, the Office Action focuses on the presence of physical transformation among the claim elements without considering the claim as a whole. That analysis is incorrect. According to Interim Guidelines for Examination of Patent Applications for Subject Matter Eligibility ("Interim Guidelines"):

> To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:
>
> - The claimed invention "transforms" an article or physical object to a different state or thing.
> - The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

Interim Guidelines at 19. Thus, the Interim Guidelines set forth two alternative tests, whereby satisfaction of either test merits a conclusion that the claimed invention is statutory subject

matter. However, the Examiner has, in essence, incorrectly stated that a failure to meet the physical transformation test supports a conclusion that the claimed invention does not "otherwise produce[] a useful, concrete and tangible result." "In determining whether the claim is for a 'practical application,' the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is 'useful, tangible and concrete.'" Interim Guidelines at 20. Each of the claims is drawn to statutory subject matter in that each of the claims is directed to the useful, concrete, and tangible result of detecting errors generated in the digitization of books by a plurality of processes.

Further, the analysis in the Office Action is incorrect in light of prevailing law. The Federal Circuit found the following claim to be statutory under § 101:

> A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:
>
> generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and
>
> including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

AT&T v. Excel Comm. Inc., 173 F.3d 1352, 1354 (Fed. Cir. 1999). Note that the two claim elements are directed to "generating a message record . . ." and "including . . . a primary interexchange carrier (PIC) indicator . . . " Under the Office Action's reasoning, these two elements are pure manipulations of data, devoid of physical structures that produce a "useful, concrete and tangible" result. Therefore the claim as a whole would not be statutory under the Office Action's reasoning. The *AT&T* reasoning is equally applicable to Applicant's claim. Like the situation in *AT&T*, the final result of Applicant's claimed invention (*i.e.*, optimizing the number, placement, and size of fractures) produces a useful, concrete, tangible result without

pre-empting other uses of a mathematical principle. See *AT&T v. Excel Comm. Inc.*, 173 F.3d at 1358. Applicants therefore request that the rejection be withdrawn.

Claim Rejections under 35 U.S.C. § 112

The Office Action states:

> 9. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
>
> c. It is unclear what "optimizing" mean in the claims.
>
> d. Claims 1, 18, and 24 recite "predicted stress field". It is unclear what does that mean.
>
> e. Claim 2, 19, and 25 recite ". . . performed **prior to creating** any of the fractures. . . .". It is unclear what applicant mean by "prior to creating any of the fractures". There is no any step that shows a "creation" of fractures in claims 1, 18, and 24 (See: missing steps).

Applicants disagree. The Board of Patent Appeals and Interferences, in *Ex parte* Wu, stated that:

> In rejecting a claim under the second paragraph of 35 USC 112, it is incumbent on the examiner to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims.

10 USPQ2d 2031, 2033 (B.P.A.I. 1989 (citing *In re* Morris, 439 F.2d 1232, 169 USPQ 236 (C.C.P.A 1971); *In re* Hammack, 427 F.2d 1378, 166 USPQ 204 (C.C.P.A. 1970)).

The Office action has not (and cannot) establish that the person of ordinary skill it the art would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. Each of these terms is understandable by a person of ordinary skill with the benefit of Applicant's disclosure. "Optimizing" is understood by a person of ordinary skill in the art by itself, in the context of the claims in which it appears.

It is further discussed throughout specification in both text and figures. *See, e.g.,* Specification ¶¶ 41, 43, 46 and associated figures.

The term "predicted stress field" is understood by a person of ordinary skill in the art by itself, in the context of the claims in which it appears. It is further discussed throughout the specification in both text and figures. *See, e.g.,* Specification ¶¶ 33, 36, 37, 38, 41, 43, 46, 47-51, 53, and associated figures.

Likewise, a person of ordinary skill in the art would understand the meaning of "prior to creating any of the fractures," in the context of the claims in which it appears. Applicants chose not to claim "creation" of the fractures in certain claims. This choice of claim scope does not detract from patentability of the claims under Section 112, ¶ 2. The Office action has presented no showing of how the lack of claiming "creation" of fractures renders claims 2, 19, and 25 indefinite.

The Office Action states:

> 10. Claims 1, 18, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are:
>
> f. As per claim 1, 18, and 24, for example claim 1 recites:
>
> (c) determining a predicted stress field based on the geomechanical stresses induced by each fracture; and,
>
> (d) generating an optimized number, placement and size for one or more fractures in a subterranean formation.
>
> there is missing steps between the steps of (c) and (d). It is unclear how to get from step (c) to step (d).

Applicants disagree. MPEP § 2172.01, paragraph 2 states "a claim which fails to interrelate essential elements of the invention as defined by applicant(s) in the specification may be rejected under 35 U.S.C. 112, second paragraph, for failure to point out and distinctly claim the invention." This is not the case here. As described above, the Office action fails to present a *prima facie* case of indefiniteness. The statement that "[i]t is unclear how to get from step (c) to step (d)" is merely conclusory and fails entirely to consider how a person of ordinary skill in the

art would understand the claim as a whole with the benefit of the disclosure. Finally, Applicants have amended claims 1, 18, and 24 to introduce language that was implicit before to show that the generation is based on previously determined stresses and number of fractures.

The Office Action states:

> g. As per claims 1, and 18, "predicting" stress field, "optimizing" a number, and/or "creating" fractures are omitted steps

Applicants disagree. None of these are omitted steps. As discussed above, the Office action has failed to present a *prima facie* case of indefiniteness. Furthermore, Claims 1 and 18 include a step of "determining a predicted stress field." A step of "predicting" the stress filed would be redundant. Applicants chose to use the gerund "determining." The choice of this gerund does not render the claim indefinite. Likewise, claims 1 and 18 already include a step of "generating an optimized number, placement and size for one or more fractures in a subterranean formation." Applicants chose to use the gerund "generating." The choice of this gerund does not render the claim indefinite.

The Office Action states:

> h. As per claim 24, "predicting" a stress field, and/or "creating" fractures are omitted steps.

Applicants disagree. None of these are omitted steps. As discussed above, the Office action has failed to present a prima facie case of indefiniteness. Furthermore, claims 24 include a step of "determining a predicted stress field." A step of "predicting" the stress filed would be redundant. Likewise, claims 1 and 18 already include a step of "generating an optimized number, placement and size for one or more fractures in a subterranean formation." Applicants chose to use the gerund "generating." The choice of this gerund does not render the claim indefinite.

Claim Rejections under 35 U.S.C. § 102

The Office Action states:

> 14. Claims 1-29 are rejected under 35 USC 102(b) as being anticipated by M.Y. Soliman, and A.M. Elrabaa, "Fracturing

> Aspects of Horizontal wells", herein referred as Soliman, 1990 Society of Petroleum Engineers, pages 966-973.
>
> As per Claim 1:
>
> Soliman discloses a method of optimizing a number, placement and size of fractures in a subterranean formation (See: "Summary" in page 966) comprising the steps of:
>
> (a) determining one or more geomechanical stresses inducted by each fracture based on the dimensions and location of each fracture (See: page 967, "Determining Magnitude and Orientation of Least Principal Stress");
>
> (b) determining a geomechanical maximum number of fracture is based on the geomechancial stresses induced by each of the fractures (such as . . . reaching five fractures after a month (i.e. five fractures are maximum number of fractures) but declines to only two fractures after 24 month . . .; See: page 969, middle column, lines 9-13);
>
> (c) determining a predicted stress field based on the geomechanical stresses induced by each fracture (See: page 967, "Determining Magnitude and Orientation of Least Principal Stress"); and
>
> (d) generating an optimized number, placement, and size of one or more fractures in a subterranean formation (See: Figs. 15, 16, 17, table 2 and corresponding texts).

Office Action, at 7.

Applicants disagree. Claim 1 requires, in part, "determining one or more geomechanical stresses **induced by each fracture based on the dimensions and location of each fracture**." Soliman does not disclose this limiation. The Office action argues that this limitation is dislcosed by Soliman at page 967. That portion of Soliman, however, discusses determining the magnitude and orientation of least principal stress in a formation. It does not include any discussion of determining the stresses induced by each fracture, as required by the claim. The cited section of Soliman does not mention a fracture, much less the stresses induced in the formation by the fracture. Other portions of Soliman similary fail to disclose this limaition.

Claim 1 further requires, in part, "determining a geomechanical maximum number of fractures based on the geomechanical stresses induced by each of the fractures." This

limitation is not disclosed in Soliman. The Office aciton cites a portion of Soiman that states "[t]he number of fractures at which the maximum flow rate occurs decliens with time, reaching five fractures after 1 month but declining to only two fractures after 24 months." Soliman, at 969. Soliman's discussion of "number of fractures at which the maximum flow rate occurs" is not a disclosure of "**a geomechanical maximum number of fractures**." For example, a given formation may be able to support a large number of fractures geomechanically, but the number of fractures required for maximum flow rate may be much less. Furthermore, Soliman's determiniation of "[t]he number of fractures at which the maximum flow rate occurs" is not based on "**stresses induced by each of the fractures**," as required by the claim.

For at least these reasons Soliman fails to disclose the limiations of claim 1. Independent claims 18 and 24 include similar limiations, which are silimarly not disclosed by Soliman. Each of the remaining claims depends from one of claims 1, 18, or 24 and are therefore patentable over the cited references.

SUMMARY

Applicants contend that the claims are in condition for allowance, which action is requested. Should any additional fees be required, Applicants request that the fees be debited from deposit account number 02-0383.

Respectfully submitted,

/Bradley S. Bowling/
Bradley S. Bowling
Reg. No. 52,641
ATTORNEY FOR APPLICANTS

Date: April 16, 2008